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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/068,930	02/08/2002	Igor N. Belykh	84105WFN	9420

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EXAMINER

KRONENTHAL, CRAIG W

ART UNIT	PAPER NUMBER
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2627

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/068,930	Applicant(s) BELYKH ET AL.	
	Examiner Craig W. Kronenthal	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/12/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-8, 14 and 15 is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/12/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed May 12, 2005, has been entered and made of record.
2. The objection to the information disclosure statement has been withdrawn in view of the newly submitted IDS.
3. The objection to claim 1 has been withdrawn in view of the amendment.

Response to Arguments

1. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear as to whether the process of designing the notch filter incorporates a smoothing window and an edge and spike elimination function. The specification seems to identify the edge and spike elimination functions as the pre-convolution and post-convolution procedures (paragraph [0065]), which are implemented after the design of the notch filter and therefore not incorporated in the designing process. The language of amended claim 9 seems to support this as well.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 9, 10, 12, 13, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yazici et al. (PN 6,333,990) (hereinafter Yazici) in view of Hamming ("Digital filters" referred to in the provided IDS dated 2/8/02) and Potter ("Compilation of time windows and time shapes for Fourier analysis" referred to in the provided IDS dated 2/08/02).

Regarding Claim 1: Yazici discloses a method for detecting and attenuating grid artifacts (grid line artifacts, col. 2, line 58) in a digital radiographic image comprising:

- Providing an input digital radiographic image (col. 2 lines 48-49). [The x-ray image formed from the results of the detectors (Fig. 1, 130) is the input digital radiographic image.]
- Processing said input digital radiographic image with a detection algorithm based on 2-D dynamic correlation in both spatial and frequency domains to determine whether said input digital radiographic image has grid artifacts (col. 3 lines 1-12). [The removing method includes the detection of grid line artifacts based on a 2-D

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dynamic correlation in the spatial domain in steps 212 (Fig. 2)/266 (Fig. 3) and 214 (Fig. 2)/264 (Fig. 3). The 2-D dynamic correlation is represented by the comparison of a histogram of the gradient image with a threshold "T" (col. 4 lines 30-32). Also in the spatial domain, another 2-D dynamic correlation takes place between the image and an intensity threshold "I" (col. 4 lines 38-39). A 2-D correlation is also done in the frequency domain (col. 6 lines 1-5).]

- Suppressing said grid artifacts by further processing said input digital radiographic image with said designed filter to produce an output digital radiographic image of improved image quality (col. 5 lines 62-65). [The spectral components of range 390 in Figure 8 are the result of eliminating the grid artifact (Fig. 3, 380) of the range 390 in Figure 7. It is clear from the figures that the new grid line spectral component (Fig. 8, 381) is a suppressed version of the original grid line spectral component (Fig. 7, 380).]

Yazici does not expressly teach designing an adaptive notch filter. However, based on the admitted prior art (p. 4, [0049], lines 1-8) it is understood that Hamming's "Digital filters" discloses the use of orientation, frequency, and signal-to-noise ratio in designing a notch filter. It would have been obvious to one of ordinary skill in the art to use the notch filter as taught by Hamming to attenuate the magnitude of a peak over a range (Yazici, Figures 7 and 8, item 388), as done by Yazici. Furthermore one would have been motivated to make this modification because Hamming indicates the use of notch filters for narrow ranges (p. 110, second paragraph). In addition, it would have been obvious to one of ordinary skill in the art to modify the combination of Yazici and

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Hamming to produce a notch filter with a smoothing window as taught by Potter. Yazici teaches the use of window substitution to eliminate the presence of artifacts caused by windowing (col. 6 lines 40-42). Therefore, one of ordinary skill in the art would have been motivated to replace window substitution with a smoothing window as taught by Potter to eliminate the effects of the artifacts identified by Yazici.

Regarding Claim 2: Yazici discloses the method wherein said processing includes consequent dynamic analyzing image profiles in two dimensions both in spatial and in frequency domains in a predefined square sub-region of the input digital radiographic image (window) in each of horizontal and vertical directions. [Yazici teaches the dividing of an x-ray image into N windows (Fig. 2, 210) which reads on analyzing image profiles in a predefined square sub-region (col. 3 lines 16-18). Analyzing image profiles is achieved in the correlation processes in both the spatial and frequency domains (see the analogous arguments made regarding claim 1). The x-ray image is a two dimensional image and therefore a complete correlation of the image with a threshold would require analyzing the profiles in both the horizontal and vertical directions. In the frequency domain, specifically the Fourier domain, the x-axis and y-axis are representative of the horizontal and vertical directions.]

Regarding Claim 9: Yazici discloses the method wherein said step of suppressing includes using a spike effect elimination function and an edge effect elimination function (col. 3 lines 4-8) [The suppressing step includes both the replacing of edgy regions with

non-edgy regions (212) and the replacing of high intensity regions with low intensity regions (214). The replacing of edgy regions (212) represents the edge effect elimination function. The replacing of high intensity regions (214) represents the spike effect elimination function.] Yazici does not disclose calculating the notch filter coefficients. However, as admitted in the applicant's specification (paragraph [0050]), Potter teaches calculating finite impulse response notch filter coefficients, wherein said finite impulse response notch filter coefficients calculating includes using a trigonometric trapezoid filter algorithm with Potter P310 smoothing window. It would have been obvious to combine Potter with the combination of Yazici and Hamming for reasons explained in claim 1.

Allowable Subject Matter

6. Claims 3-8, 14 and 15 are allowed.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig W. Kronenthal whose telephone number is (571) 272-7422. The examiner can normally be reached on 8:00 am - 5:00 pm / Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

10/20/05
CWK



SANJIV SHAH
PRIMARY EXAMINER